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other charge. After six ounces of the mixture had been added, the contents of the crucible was covered with fused chloride of sodium in powder, the cover replaced, and the heat carried to quiet fusion. After the flux became entirely fluid, the heat was continued for ten minutes. The crucible was then removed from the fire, and, after cooling, the metal was found as a button at the bottom.

Three crucibles, of the capacity of eight fluid ounces each, were used at a time in a furnace without artificial blast. Care is necessary not to urge the heat too high, otherwise the crucibles will not resist the action of the fluorspar flux. The French-clay crucibles (Beaufay) were used, on account of their greater freedom from iron and silica; they also resist the flux better than the Hessian, black lead, or iron crucibles. The yield of manganese, under favorable circumstances, was about twenty per cent of the chloride used.

Reduction was also tried by using fused chloride of sodium without fluorspar. The yield of metal was much less, and differing in some of its properties from that obtained with the use of fluorspar. Manganate of soda was formed when sodium chloride alone was used as a flux. Manganese thus obtained is very brittle, with a steel-white fracture so hard that a file will scarcely touch it. The edges of the fractures scratch, and almost cut, glass. The metal retains the brightness of a fractured surface after prolonged exposure to the air, and appears not more disposed to oxidation than iron. It is entirely passive to magnetic attraction.

The specific gravity of the metal obtained when fluorspar was used was 7.072. When remelted under fused sodium chloride, the specific gravity rose to 7.153. The metal obtained without the use of fluorspar was less brittle, and had a different fracture. Its specific gravity was 7.231. Authorities differ regarding the specific gravity of manganese, ranging it from 6.85 to 8.013.

An examination of the metal obtained, using fluorspar as a flux, showed the absence of iron and the presence of calcium, demonstrating the reduction of some of the latter metal from the spar. This may account in a measure for the increased specific gravity on remelting under sodium chloride, as also the greater specific gravity of the metal when the spar was not used. As calcium has the specific gravity of 1.57, a small amount alloyed with the manganese would sensibly affect its gravity.

ETHNOLOGY.

Marriage Ceremonies of the Bilqula.

MR. PH. JACOBSEN, in a letter to his well-known brother, Capt. A. Jacobsen, gives the following description of the marriage ceremonies of the Bilqula of British Columbia. An Indian who intends to marry, calls upon his intended wife's parents, and arranges with them how much he is to pay for permission to marry the girl. Among people of high descent this is done by messengers, sometimes as many as twenty being sent to call on the girl's father. They are sent by the man's parents before the young man is of age. In many instances both man and girl are not more than eight or nine years

The messengers go in their boats to the girl's house, and marry on their negotiations without going ashore, where the relatives of the girl are standing. The messengers of the young man's parents praise his excellence and noble descent; the great exploits of his father, grandfather, and ancestors; their wars, victories, and hunting expeditions; their liberality at festivals; etc. Then the girl's relatives praise the girl and her ancestors, and thus the negotiations are carried on. Finally a number of blankets are thrown ashore by the messengers; and the girl's relatives protest, and maintain that the number is not sufficient to pay for the permission to marry the girl. In order to obtain their consent, new blankets are thrown ashore one by one, the messengers continually maintaining that the price paid is too great. Generally from twenty to fifty blankets, each of the value of about half a dollar, are paid.

After this the boy and the girl are considered engaged. When they come to be grown up, the young man has to serve a year to his father-in-law. He must fell trees, fetch water, fish, and hunt for the latter. During this time he is called Kos, which means "one who wooes." After a year has elapsed, the marriage is celebrated. At this time great festivals are celebrated. Seven or eight men perform a dance. They wear dancing aprons and leggings, trimmed with puffin-beaks, hoofs of deers, copper plates, and bells. If the groom should be a wealthy man, who has presented to his wife many small copper plates, such as are used as presents to a bride, these are carried by the dancers. The singing-master, who beats the drum, starts a song in which the dancers join. The song used at the marriage festival is sung in unison, while in all other dances each dancer has his own tune and song. The first dancer wears a ring made of cedar-bark. His hair is strewn with eagle-down, which flies about when he moves, and forms a cloud around his head. The groom presents the first dancer with a piece of calico, which the latter tears to pieces, which he throws down in front of each house of the village, crying, "Hoip!" in order to drive away evil spirits. These pieces of calico which he throws down in front of the houses have a lucky meaning, and at the same time express the idea that the groom, when he comes to be a wealthy man, will not forget the inhabitants of any house when giving a festival. The dancers swing their bodies and arms, stamp their feet, and show the copper plates to the lookers-on. Then the bride's father brings a great number of blankets, generally double the number of those he had received from the groom, and gives them to his daughter. The bride orders a few blankets to be spread before the groom. She sits down, and he puts his hand upon her head. Then the groom is given for each of the parts of his body one or more blankets. Finally he is given a new blanket. After the bride's father has given a blanket to each dancer and to the drummer, the villagers are invited to a great feast. At this time groom and bride eat for the first time together.

HEALTH MATTERS.

American Public Health Association.

THE preliminary circular relating to the next meeting of this association has just been issued. The meeting will be held at Brooklyn, N.Y., Oct. 22–25, 1889.

The executive committee have selected the following topics for consideration at said meeting: — 1. The causes and prevention of infant mortality. 2. Railway sanitation: (*a*) Heating and ventilation of railway passenger-coaches; (*b*) Water-supply, water-closets, etc.; (*c*) Carrying passengers infected with communicable diseases. 3. Steamship sanitation. 4. Methods of scientific cooking. 5. Yellow-fever: (*a*) The unprotected avenues through which yellow-fever is liable to be brought into the United States; (*b*) The sanitary requirements necessary to render a town or city proof against an epidemic of yellow-fever; (*c*) The course to be taken by local health authorities upon the outbreak of yellow-fever. 6. The prevention and restriction of tuberculosis in man. 7. Methods of prevention of diphtheria, with results of such methods. 8. How far should health authorities be permitted to apply known preventive measures for the control of diphtheria. 9. Compulsory vaccination. 10. Sanitation of asylums, prisons, jails, and other eleemosynary institutions.

Papers upon miscellaneous sanitary subjects not included in the above list will be received by the executive committee, subject to the requirements of the By-Laws. Preference will be given, however, to papers upon the subjects selected by the committee in making up the daily programme of the meeting.

It is confidently expected that the Brooklyn meeting will be the largest and most important ever held by the association. The local committee of arrangements have already organized, and have the preliminary local work well under way. No efforts will be spared to make the meeting a grand success, and every arrangement necessary to the comfort of those attending will be made in ample season.

The growth and work of this association constitute a monument to American hygiene. It was organized in 1872, and has grown to be the largest association of its kind in the world, and embraces in territorial area the United States, the Dominion of Canada, and the Provinces. It has published fourteen large volumes on health subjects, one volume on disinfectants (which is the most complete

work of its kind in the English language), over one hundred and twenty thousand copies of the Lomb Prize essays, besides numerous reprints. The influence of this great work upon the public-health interests of the country can scarcely be estimated.

ICE-WATER. — In the opinion of the editor of *The Sanitary Volunteer*, the official organ of the New Hampshire Board of Health, there is a great deal of sentiment and many opinions, regarding the use of ice-water, that vanish when the light of reason and experience is turned upon them. The fact is, that ice-water, drank slowly and in moderate quantities, constitutes a healthful and invigorating drink. There is no doubt that ice is a great sanitary agent, and every family ought to be provided with it during the warmer months of the year. It is true that the inordinate use of ice-water, or its use under some special conditions and circumstances, is attended with great danger: so is the improper use of any other drink or food. The assumption that iced water is dangerous, and that iced tea, or iced coffee, or iced lemonade is a harmless substitute, is simply a delusion. As the source of danger feared by some is the degree of cold, we fail to see clearly how flavor modifies the effect of temperature. There are some individuals, undoubtedly, who cannot drink ice-water without injury, and who ought never to use it, but to a great majority of persons it is refreshing and healthful. Its use, temperate and discreet, is in no way to be condemned, which cannot be said of some of its substitutes.

THE MORTALITY AMONG NURSES. — The advocates of the non-bacillary origin of tuberculosis have sought support for their position in the immunity often enjoyed by nurses and attendants on the phthisical. That this immunity is the exception, and not the rule, seems indicated by recent studies by Cornet. In the *Zeitschrift für Hygiene*, Cornet publishes the tabulated results of his comparison of the mortality rates in the population of towns and cities and in nurses. These results are summarized in *The Medical News*. A large proportion of German nurses are members of religious orders, who, by reason of their secluded, regular lives, are removed from many causes of acute disease. Such nurses are in the best mental and moral condition to insure health, for which and other reasons the infective diseases ought not to be especially prevalent among them. Care was taken to select orders whose members serve for life and remain celibate. The material collected was from 38 cloisters, embracing an average yearly service of 4,028 women, whose aggregate service in years was 87,450. An examination of this material during twenty-five years revealed 2,099 deaths, 62.88 per cent of which were from tuberculosis, or nearly two-thirds. The usual proportion of deaths from tuberculosis is from one-seventh to one-fifth. Next to tuberculosis comes typhoid, while cancer shows a slightly increased rate of mortality. Death occurred among these nurses at an average age of 36.27 years, an average shorter life than that of workmen exposed to the inhalation of injurious dust, by eight or ten years. The death-rate from tuberculosis among nurses attains its maximum between the thirtieth and fortieth years, and then steadily declines. When a comparison of the death-rate of nurses and the population of a town is made, it is found that between the ages of 15 and 20 the mortality among nurses is four times that of other population; from 20 to 30, three times; from 30 to 40, twice as great; afterward becoming about equal. The explanation of these facts is found in the prevalence of tuberculosis among nurses, it being nine times more frequent than among other classes. All infectious diseases are more frequent among nurses until the fortieth year of life, after which their death-rate is lower than that of other classes. It is further shown that during the first six months of service the nurse enjoys comparative immunity from infection. After that, the mortality and morbidity rate steadily rises for three years, during which the greatest number of deaths occur. The life chances of nurses do not compare favorably with others. A nurse beginning her profession at seventeen has twenty-one and a half years of life less than a woman of the same age not exposed to infective diseases. So far as relative age is concerned, a nurse at twenty-five has the chance for life commonly enjoyed at fifty-eight; at thirty-three years, the outlook of a person aged sixty-two.

UNDERGROUND WATER AND BACTERIA. — Underground water and bacteria were the theme of a recent lecture delivered by Dr. C. Fraenkel, assistant to the famous bacteriologist, Dr. Robert Koch, in the Hygienic Institute at Berlin. The gist of the lecture was that the underground water of Berlin is free from bacteria, that this surprising fact is due to the great filtering-power of the ground, and that consequently the water drawn from the artesian wells is perfectly wholesome. These results do not correspond with those obtained in New York, where the water from artesian wells has in many, if not all, cases proved to be impure.

THE FLY AS A DISEASE-CARRIER. — With the bacteriologists, another domestic animal, the fly, is coming in for his share of incrimination for spreading infectious diseases. It has long been known that, if not the house-fly, at least some kinds which are near relations of his, have sometimes been guilty of causing malignant pustule by carrying the contagion of anthrax from diseased animals or animal substances to man. During the past year Dr. Alessi has been experimenting with flies to determine their liability to spread the infection of tuberculosis. The bacillus of this disease was found in the intestines and the excrement of flies which had feasted on tuberculous sputa; and their dried fæces, in which, with the aid of the microscope, the bacillus was known to exist, was used for inoculating rabbits, and the animals became tuberculous. Thus it is found that the digestive tract of the fly is harmless to the germ. Spillmann and Haushalter have also made similar researches, with the same results; and lately, according to the *Annals d'Hygiene Publique*, a Mr. Howe, who has studied the subject in the Nile country, has found that the granular ophthalmia of that region can be spread by means of house-flies passing from the eyes of those who are affected with the disease to other persons.

BOOK-REVIEWS.

Principles of the History of Language. By HERMANN PAUL. Tr. by H. A. Strong. New York, Macmillan. 8°. $3.

PROFESSOR STRONG has done a service to English readers by translating this work, which contains a more comprehensive survey of the principles of linguistic science and of the methods of studying it than can readily be found elsewhere. It may be said to consist of two parts, though they are not sharply separated. The earlier chapters deal mainly with the general principles of language and the chief determining causes of its development, while in the later ones these principles are followed out into their applications, and discussed with great fulness of detail, and wealth of illustration. Professor Paul has a very clear and correct conception of his favorite science, of its relation to the other sciences, and of the right mode of studying it. The science of language is not an exact science, much less a physical science, as Professor Max Müller maintains, but a department of history. Its principal basis is psychology, and the leading facts with which it deals are groups of ideas. The physical factor, however, must not be ignored; the language consists of spoken sounds, and it is only through the medium of the material world that we are able to communicate with our fellowmen. Nevertheless, the chief factor in its development is not the body, but the mind, and mind as it exists in society.

Having thus clearly indicated the scope and method of the science, Professor Paul goes on to state the leading causes of linguistic development. One of the chief of these is the tendency to sound-change; that is, to variability of pronunciation, which arise from slight changes in muscular action due to variations in the sensations attending such action. Another potent cause is change in the signification of words, which is perpetually going on, and which enriches the expressive power of language incalculably without adding any new words. This change in the signification of words is sometimes a restriction of the original meaning, sometimes an extension of it; while in other cases it takes the form of metaphor or some other figure of speech. Analogous to those developments are the numerous changes in syntax, while another and perhaps still more potent agent in the development of speech is composition, leading to inflection and word-formation. Professor